

### III

## PULMONARY SYPHILIS

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OF the diseases affecting the human race, pulmonary tuberculosis is regarded, not only as one of the most grave, but also as one of the most common. It is generally hailed as "The Captain of the Men of Death." That this is so is evident from the far-reaching, carefully organised, and costly Public Health measures that have been instituted to combat it.

That tuberculosis is a common disease has been amply demonstrated. Osler instances the investigations of Naegeli in this respect. In a series of cases studied, 97 per cent. of adult bodies showed tuberculosis lesions. In every body over the age of forty years, a focus of tuberculosis was found. The same author also quotes Bulmer and Lartigan as finding healed lesions of pulmonary tuberculosis in 30 per cent. of 500 bodies investigated in the post-mortem room.

Not only records such as these, but general experience also, make it very clear that this disease is one in which spontaneous cure occurs with great frequency. Clinical evidence of this is to be found in the multitude of patients who, having for a time coughed up tubercle bacilli, have, under general hygienic treatment—and often in its absence—ceased to do so, and have completely recovered. Anatomical proof is furnished by the post-mortem finding of tuberculosis lesions undergoing resolution and repair.

The treatment of pulmonary tuberculosis is at the present day not specific. Success does not involve a direct attack upon the tubercle bacillus, but rests simply upon the principle of raising the defensive mechanism of the host. Recovery from the disease appears to be dependent upon how far the internal economy of the patient can be stimulated and built up. The aim is so to raise the bodily condition that a stage will be attained in which the bacillus tuberculosis will find the environment so

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unsuited to its existence that it will succumb. That is what Sanatorium treatment accomplishes. Experience shows how very little of it may, at times, be necessary to obtain good results. It is really a regimen which is suitable for, and which is indicated in, disease of any kind. It is applicable in equal degree to fractured femur, neurasthenia, and chicken-pox. Recovery is always more rapid and more certain in the pine groves of Hygeia than in the workshops of Vulcan.

There are several reasons why this so-called "sanatorium treatment" is more successful in pulmonary tuberculosis than in any other specific disease. The causal organism is comparatively vulnerable. Tuberculosis only attacks, and survives in, an unhealthy person. It can only thrive in a suitably debilitated soil. It cannot exist in a healthy body. Furthermore, there exists in the vast majority of civilised individuals a variable degree of immunity to it. The essence of treatment consists in placing the infected person in the optimum hygienic surroundings, so giving his body freedom to work out its own salvation.

The general trend would appear to be towards recovery, and there would seem to be but little tendency for the consumptive to remain *in statu quo*. He either recovers to break his neck in the hunting field, or coughs his way into the Valley where "finis" is written by Asthenia, Syncope, or Hæmorrhage.

Strictly speaking, the diagnosis of any specific disease can only be clinched by the discovery of the specific organism, by the occurrence of a somatic or local tissue-reaction characteristic of the specific organism, or by some specific serum—or other test. The identification of the organism is, of course, conclusive.

A diagnosis of tuberculosis of the lungs cannot be made on physical signs alone. By such means one may conclude that there is fibrosis, a cavity, inflammation, and such-like; but the identification of the cause of these conditions is dependent upon the microscope and the laboratory. Pulmonary tuberculosis can only be definitely diagnosed by the demonstration of the bacillus of Koch, or by the finding of lesions or physical signs, which are capable of being produced by that organism alone. Of course in practice a lung condition is often diagnosed as being tubercular on the history and the physical signs. It must inevitably be so; and no doubt the

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majority of such diagnoses are correct ; but they are merely guesses nevertheless. The correctness of the guess depends upon the clinical experience and acumen of the physician. Nay more, the accuracy of the diagnosis will vary directly with the amount of knowledge that the clinician possesses of the morbid conditions, other than tuberculosis, which may affect the lungs.

The frequency with which the pulmonary tissues are attacked by the tubercle bacillus has made the possibility of pulmonary *syphilis* seem to the clinician a very remote one. This is due in great part to the usual teaching that a luetic condition of the lungs is an extremely infrequent occurrence. It will be well to consider upon what grounds the rarity of pulmonary syphilis has been asserted.

Without seeking to obtain the title of "Bolshevik," one would venture to say that in medical science, respect for authority has very narrow limits of desirability or usefulness. The prestige of John Hunter and the misinterpretation of his ill-fated personal experiment established for too long the error of the identity of syphilis and gonorrhœa. This dictum was handed down from teacher to pupil in much the same way as is, at the present day, the myth of the osteogenetic function of the periosteum.

Osler is generally quoted as the firmest authority for the statement that pulmonary syphilis is very rare. Osler and Gibson say that in 2,500 autopsies performed at the Johns Hopkins Hospital in Baltimore, in only twelve cases was lung syphilis demonstrated. Fowler's study of all the specimens available in the London hospitals revealed only ten undoubted cases of syphilis pulmonalis. Downing investigated 3,000 autopsies at the Massachusetts General Hospital for lung syphilis with totally negative results. Hazen states that in 6,000 cases of syphilis taken from the records of the Copenhagen Hospital, there were but two cases of pulmonary lues. Jonathan Hutchinson remarks upon the rarity of the condition. It is upon these foundations that the teaching of the rarity of pulmonary syphilis is based.

In order to obtain a proper perspective of the syphilitic landscape, it is well, at first, not to focus attention too closely upon the lungs. By taking a more general preliminary survey there may be found a more favourable stance from which to view syphilis in its purely pulmonary aspect.

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Symmers analysed the results of 4,880 post-mortem examinations which were performed in ten years at the Belle Vue Hospital in New York. Evidence of syphilis in some organ was demonstrated in only 314 cases, or 6·5 per cent. Warthin, on the other hand, made 750 autopsies in the rural district of Ann Arbor in Michigan, and found syphilis to be present in 300 instances, or in 40 per cent. of cases.

Bearing in mind the respective venues in which these studies were made—the former in a great city among the poorer classes; the latter in a country district among more well-to-do people—the results are very striking in their wide divergence. Either of the two explanations, (1) that in the United States syphilis is more common in the country than in the city, or (2) that all the syphilitics in the North American continent go to Ann Arbor to die, is untenable. It is only mental inertia which would suggest that the truth must lie somewhere between the two. The true explanation is only to be arrived at after an examination of the standards of diagnosis applied in either case. In every analysis or statement that is made concerning the diagnosis of syphilis or its incidence in any organ, the criteria upon which the diagnosis is based must be critically considered.

Medical evidence is often—and when there is no need for it to be so—of a very lax character; and this both in its positive and negative aspects. Such evidence is frequently submitted, and accepted, when it is of such a nature as to be quite valueless in a court of law. The presence of an indurated penile ulcer or an apparently typical rash on the chest is by no means proof of syphilis, although it would, in the consulting room, be a sufficient indication for the institution of antisymphilitic treatment pending the arrival of the laboratory report. While it is but right and proper in the living to give the patient the benefit of the doubt by commencing treatment, in the cadaver, the presence or absence of syphilis must only be concluded after a most rigid and searching examination. The evidence, in order to carry conviction, must not only be consistent with the presence of syphilis, but must at the same time be inconsistent with its absence. The converse, of course, is equally true.

The criteria for the diagnosis of syphilis in the dead are the demonstration of the *treponema pallidum*, and of the

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histological changes which are alone typical of its activities. The work of Graves showed that post-mortem Wassermann tests confirmed the ante-mortem reports in 97 per cent. of cases. The post-mortem Wassermann should, therefore, not be omitted. The presence of syphilis may be inferred—and often with some assurance—from gross evidences alone ; but its absence can only be accepted after negative bacteriological, histological, and serological investigation. Its presence can only be definitely proved after a similar series of examinations have yielded positive results.

Now, Symmers's diagnoses were made upon gross pathological appearances—aortitis, aneurism, gummata. The latter has long been enthroned as the symbol *par excellence* of post-mortem syphilis. This has been proclaimed by book after book, and is still, no doubt, being broadcast into the more or less receptive ears of the medical student. The general view is that the frequency with which gummata are found in an organ after death is an index of the incidence of syphilis of that organ during life. The truth is that the gumma is an impostor. If it be taken as the criterion of post-mortem syphilis, then syphilis is not only a rare disease of the lungs, but is an infrequent disease of any part of the human body.

The essence of the syphilitic reaction—that is, the response of the tissues to the activities of the *treponema pallidum*—is that it is of the nature of a granuloma originating in the perivascular lymph spaces as an infiltration of lymphocytes and plasma cells. The chancre, the cutaneous syphilides, the gumma, the fibrosis, are all simply different stages and degrees of this reaction. The type depends upon the organ or tissue affected, the age of the disease, and the time that the reaction has been in progress. There is no essential histological difference between the primary and the tertiary or other lesion. The matter of the incidence and diagnosis of syphilis in the dead body resolves itself into a decision as to what is the type-lesion and how it is to be identified. This is especially so when the disease is in its late or so-called “latent” stages.

The latter term is a misnomer. The disease can never be latent. It can only be present or absent. If it is present it is invariably *active*, although it may not, at

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the moment, be giving rise to well-defined clinical signs. Whenever syphilis is present, whenever a positive result is obtained in a Wassermann test, active pathological processes are taking place in some organ or tissue of the body. Such a condition is most properly termed "endosyphilis," which means *syphilis without clinical signs*. In such cases, the presence of the disease is indicated by a distinct histological picture in the organ affected.

The gross signs of syphilis which have been mentioned—those lesions which are appreciable by the naked eye—are to be regarded merely as the ultimate response of the tissues, principally reparative in nature, to the activities of the *treponema pallidum*. Warthin showed, as a result of his investigations, that the gumma is not the typical lesion of late or of endosyphilis. The viscera are involved in all such cases, and the type-lesion consists, not of gummatous, but of specific inflammatory processes. This condition eventually proceeds to fibrosis, and perhaps further. The typical inflammatory reaction is mild in character, but is of profound pathological importance because of its *steady progressive nature*.

In his 750 autopsies, of which 40 per cent. were found to be syphilitic, Warthin adopted the histological and modern method of investigation. His standard of diagnosis was most rigid; and indeed it is the only one capable of carrying positive or negative conviction. His first endeavour was to demonstrate the *treponema pallidum* in the tissues. By the Levaditi method this was a comparatively easy matter in congenital cases, and especially in the heart-muscle. In all cases of congenital syphilitic myocarditis there was seen a typical microscopic picture of oedema of the interstitial tissues with a lymphocyte and plasma cell infiltration. It has been fairly generally accepted that luetic myocarditis is secondary to a periarteritis of the coronary vessels, but Warthin has shown that it may be a primary condition. In congenital myocarditis the *treponema pallidum* was constantly found, and fibroblastic and angioblastic proliferations were also present. Although the presence of *treponemata* is necessary to cause the typical histological appearances, yet the organisms may be in the congenitally syphilitic tissues without producing any of these changes.

In cases of acquired syphilis, the *treponema pallidum*

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In order to obtain a proper perspective of the syphilitic landscape, it is well, at first, not to focus attention too closely upon the lungs. By taking a more general preliminary survey there may be found a more favourable stance from which to view syphilis in its purely pulmonary aspect.

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A new and more accurate pathology of syphilis has arisen, and by virtue of it fewer cases are missed. The practical point is that under the old concept it was only possible to diagnose syphilis in the dead body when very gross evidences were apparent.

From a consideration of the foregoing it would appear that the hitherto accepted teaching as to the rarity of lung syphilis requires revision. Recent post-mortem examinations show, when modern criteria of diagnosis are adopted, that the general incidence of syphilis is much higher than was at one time believed or suspected. An investigation along modern lines, with special reference to the lungs, is a field that is worthy of the very closest attention by the histo-pathologist. Only after it has been fully traversed will the picture of pulmonary syphilis appear in true perspective.

A very thorough study of this kind was carried out by Carrera upon the lungs of 150 cases of undoubted syphilitics. These lungs were examined histologically, but naturally, considering the size of the organs, the amount of tissue actually passed under the microscope was relatively small. A negative result is not, therefore, absolutely indicative of the absence of syphilis; a small luetic area might easily have been missed. A certain unknown proportion of the negative results it is justifiable to attribute to inadequate search. Positive diagnoses were made only upon modern histological criteria. Out of the 152 cases examined, twelve were found to have pulmonary syphilis, or roughly, 8 per cent.

Contrary to what is found in miliary tuberculosis of the lung, gummata do not fuse, but remain discrete. Where caseous areas are present, fibrin threads are absent. This is again in contrast to what is found in tuberculosis. In all cases the gumma is found to be essentially a vascular lesion consisting of "angioblastic proliferations infiltrated with plasma cells and histogenetic lymphocytes." In the affected areas, elastic tissue is generally seen to be more abundant than is the case in tuberculosis. The gummatous area fades gradually into the neighbouring tissue, while the tubercle is sharply demarcated from its surroundings. The healed scars of lung syphilis are characteristic, being of irregular form, and showing branchings as well as vascularisation.

Although out of the 152 cases only twelve were posi-



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tively diagnosed as pulmonary syphilis, yet at the same time, a condition of fibrosis associated with brown induration was present in the lungs of 124 bodies, or 82 per cent. In these cases it is not too easy to decide whether this fibrosis is due to the local action of the *treponema pallidum* on the pulmonary tissues, or whether all or part of it is due to cardiac damage—chronic passive venous congestion. Syphilitic fibrosis is simply the further development of the specific inflammatory process, and it proceeds along the vessels and bronchi. At present one cannot dogmatise on the matter, but it is noteworthy that while 82 per cent. of syphilitic post-mortems showed chronic passive venous congestion of the lungs, only 5 per cent. of non-syphilitics showed the same condition. It would appear from this that syphilis has a very profound effect upon the heart, with consequent secondary effects upon the lungs. This but strengthens the view that syphilis is the most potent weapon in inflicting cardiac damage. In any cadaver showing well-marked brown induration of the lungs it is very long odds in favour of the cause being syphilis.

The chief points by which primary syphilitic fibrosis may be distinguished from secondary chronic venous congestion are, the presence in the former of connective tissue bundles outside the vessels, their vascularisation, and the presence of plasma-cell infiltration. The syphilitic fibrosis shows distinct stellate radiations. On account of the fact that practically all lungs showing syphilitic fibrosis also suffer from chronic passive venous congestion, a painstaking histological study is necessary to determine which is the primary condition.

The differential diagnosis of the pulmonary connective tissue formation in syphilis and in tuberculosis may be tabulated thus :—

<i>Gumma.</i>	<i>Tubercle.</i>
Loosely packed with cells.	Closely packed.
Not sharply circumscribed.	Sharply circumscribed.
Few epithelioid and giant cells.	Many epithelioid and giant cells.
Discrete.	Confluent.
Preponderance of lymphocytes and plasma cells.	Not so.
Granular.	Hyaline.

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### *Syphilitic scar.*

### *Tubercular scar.*

Irregular, radiating, stellate.	Round.
Not sharply delimited.	Sharply delimited.
Vascular.	Avascular.
Elastic fibres.	None.
Plasma cells.	None.
Marked anthracotic pigment.	Slight.
Calcification rare.	Common.

No changes characteristic of syphilis are found in the pleura. In the bronchi, however, active syphilitic peri-bronchitis is seen. The plasma cell infiltration is characteristic, going on in places to the formation of miliary gummata. Typical arteritis is usually present. Definite syphilitic processes are at times only found in the pulmonary vessels. In every case, evidence of syphilis was found in the heart and aorta, and in the testes of every male. There was a high incidence of luetic signs in the liver, suprarenals, and in the central nervous system.

It would appear, then, that the low incidence of pulmonary syphilis is not real, but only apparent. The difficulty is in making a diagnosis during life, a want of thoroughness in post-mortem examinations, and a lack of knowledge of what to look for, and where. Gummata are infrequent in any organ ; but the gumma is not the essential lesion in either clinical or endosyphilis. There is every reason to believe that the lungs are no more immune to the mild general infection of syphilis than are the other organs. One point does emerge very clearly, and that is that the essential lesions of syphilis are the same in the lungs as they are elsewhere ; and from the clinical aspect, the lungs of every syphilitic must be regarded as " damaged goods."

There now falls to be considered the relationship of all these pathological findings in the dead, to the incidence and the diagnosis of syphilis in the living. Enough has been said to show that pulmonary syphilis is not a rare condition, and that changes in the lungs secondary to syphilitic lesions elsewhere—and especially in the heart—are of very common occurrence.

The first point of practical importance to be noted is the close clinical resemblance that exists between lung tuberculosis and lung syphilis. It is inevitable—and

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the attitude is a perfectly correct one—that pulmonary tuberculosis should be thought of in any given case before pulmonary syphilis. But even so, the latter should always be carefully eliminated before, in the absence of tubercle bacilli in the sputum, instituting sanatorium treatment to the exclusion of all antisyphilitic measures.

Histological post-mortem investigation provides very sure ground for the belief that the lungs share with all the other organs in the general syphilitic infection. It is therefore incumbent upon the clinician, when investigating the viscera of his syphilitic patient, to give as close attention to the organs of respiration as to the cutaneous, circulatory, and central nervous systems.

The differential diagnosis between pulmonary syphilis and pulmonary tuberculosis is not really a very difficult matter. The approximate truth may be expressed aphoristically by saying that every case of pulmonary tuberculosis which has a persistently negative sputum and which remains in a stationary condition is pulmonary syphilis.

Accurately to diagnose pulmonary syphilis in the living entails a careful consideration of the history, the physical signs in the chest, the X-ray appearances, the sputum, the Wassermann report, and the effect of antisyphilitic therapy. The two most important aids in diagnosis are the X-rays and the therapeutic test.

The fundamental pathological fact to lay hold of in considering the radiological diagnosis of syphilis of the lung is that insisted upon by Virchow, that it occurs as an interstitial pulmonitis. Three very distinct conditions can be demonstrated by the X-rays :—

- (1) Syphilitic consolidation.
- (2) Early diffuse sclerosis.
- (3) Dense sclerosis.

In syphilitic consolidation the radiogram shows a massive shadow either occupying a whole lobe or that portion of a lobe adjoining the hilum. The shadow is densest at the hilum, and gradually becomes lighter as the periphery is approached. In early diffuse sclerosis the picture shows radiating linear shadows proceeding outwards from the hilum. This is often accompanied by a diffuse mottling throughout the lung. When the condition is one of dense sclerosis, the lung is contracted and the pleura thickened. Characteristically there is seen a

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wedge-shaped shadow with its base at the hilum and with processes projecting into the surrounding pulmonary tissue. Syphilis appears to neglect almost entirely the upper lobes and to confine itself to the middle and lower ones. This is a diagnostic point of some value, since the reverse is the case in tuberculosis.

Watkins points out that in order to differentiate between tuberculosis and syphilis of the lung in a radio-gram, there must be a clear conception of the pathology of the two infections and the pathways by which they attack the organ. The first distinguishing point is that while in syphilis there is a perivascular infiltration, in tuberculosis this infiltration spreads along the lymph channels. The bronchioles within the lobule are accompanied by branches of the pulmonary and bronchial arteries, but not by veins. The main lymphatic channels are outside the lobule and accompany the veins. At the entrance to the lobule, the vein lies close to the bronchus, but it immediately separates from it and courses round the outside.

Tuberculosis proceeds along the main lymph channels and proliferation occurs in the lymph tissue surrounding the lobules. The shadow of tuberculosis is thus *perilobular* and is usually in the upper lobes and in relation to the apical and subpleural lobules. Syphilis, on the other hand, attacks the hilum first, and, proceeding along the arteries, reaches the interior of the lobule. Its shadow is characteristically dense, irregular, and *intra-lobular*. Tubercular shadows have a distinct relationship to some branch of the bronchial tree, while those of syphilis have not. The latter shadows may have an irregular edge, the lung may show a mottled appearance, or there may be dense spike-like radiations.

Clinically it is found that the patient who is suffering from pulmonary syphilis does not present a "tubercular appearance." He exhibits no progressive loss of weight, there is no marked anæmia, and he may even look plethoric. There are however many cases in which both pulmonary syphilis and pulmonary tuberculosis are present together; and in such persons, the general health is well maintained in spite of slight cavitation. They do not "go downhill" in the same manner as the pure "consumptive." Furthermore, the physical signs are usually unilateral and are more pronounced at the base of the lung.

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There is much sound sense in the institution of the routine Wassermann by those who are dealing with pulmonary tuberculosis. It is well to keep in mind the possibility of syphilis in every pulmonary condition clinically resembling tuberculosis in general, but differing from it in certain particulars such as have been mentioned. The X-ray examination should be conducted, and the radiogram interpreted, in the light of the anatomical pathways taken by the two diseases ; not as is frequently done with the diagnosis of tuberculosis already made, as a means merely of accurately locating the seat of the disease or of observing its progress. With experience, the differential diagnosis between the two conditions can be made by the X-rays alone.

One has found, from the frequency with which the two diseases co-exist, that treatment is better carried out by bismuth than by the arsenicals. This is especially so when fever is present. It has seemed in several instances that arsenobenzol has had a stimulating effect upon the tuberculosis. Where the condition is one of fibrosis, the tubercular syphilitic does well under large doses of iodides, and moderate doses of arsenobenzol with bismuth in alternate courses. In carrying out the therapeutic test one would rely upon bismuth alone.

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